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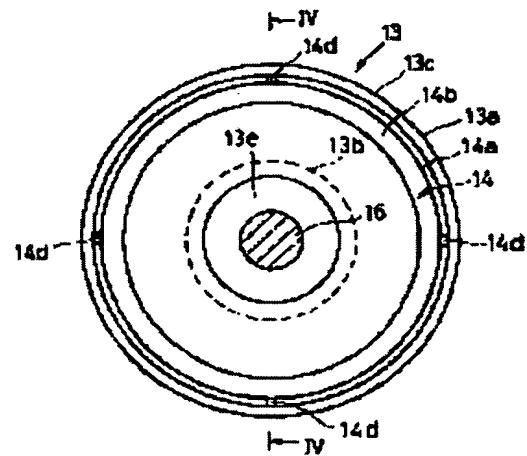
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## (54) SPOOL FOR DOUBLE BEARING REEL

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To cope with the plural number of casting methods of different initial speed by one spool.

**SOLUTION:** This spool of a bait reel is the spool freely rotatably mounted to a reel main body 1 and is provided with a spool main body 13 and an inertia adjustment member 14. The spool main body 13 is provided with flange parts 13a formed at both ends and a spool cylinder part 13b arranged between the flange parts 13a. The inertia adjustment member 14 is attachably and detachably mounted to the flange parts 13a of the spool main body 13 by a different member so as to adjust the inertia of the spool. In the spool, in the case of performing fishing by the light cast of slow initial speed, the inertia of the spool is made small by the inertia adjustment member 14. In the case of performing the full cast of fast initial speed, the inertia of the spool is enlarged.



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**CLAIMS****[Claim(s)]**

[Claim 1] A spool of both the bearing reel that is a spool of both the bearing reel with which the body of a reel is equipped free [ rotation ], and was equipped with the body of a spool which has the flange formed in both ends, and the bobbin drum section arranged between said flanges, and the inertia adjustment means with which said body of a spool is equipped in order to adjust the inertia of said spool.

[Claim 2] For said body of a spool, said inertia adjustment means is a spool of both the bearing reel according to claim 1 that consists of another members.

[Claim 3] Said inertia adjustment means is a spool of both the bearing reel according to claim 1 or 2 with which said body of a spool is equipped free [ attachment and detachment ].

[Claim 4] Said inertia adjustment means is a spool of both the bearing reel given in either of claims 1-3 which consists of members which have different specific gravity from said body of a spool.

[Claim 5] Said inertia adjustment means is a spool of both the bearing reel given in either of claims 1-4 with which the periphery section of the flange of said body of a spool is equipped.

[Claim 6] Said inertia adjustment means is a spool of both the bearing reel given in either of claims 1-5 with which said body of a spool is equipped where dynamic balance is maintained.

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## DETAILED DESCRIPTION

### [Detailed Description of the Invention]

#### [0001]

[Field of the Invention] This invention relates to a spool and a spool of both the bearing reel with which the body of a reel is equipped especially free [ rotation ].

#### [0002]

[Description of the Prior Art] Both the bearing reel has the body of a reel which has one pair of side plates, the spool with which the body of a reel is equipped free [ rotation ], and a fishing line is twisted around a periphery, and the drive containing the handle which rotates a spool.

Moreover, between the drive and the spool, the clutch device which engages and releases turning effort among them is established.

[0003] The casting which shakes a fishing rod in order to fly correctly on the point which aimed at lure when fishing using this kind of both bearing reel and the BEITO reel especially for lure fishing, and flies lure is performed. There is an approach that the initial velocity to which the initial velocity called the full cast which shakes a fishing rod greatly and flies lure on the long distance point to this casting approach is called a quick approach and the light cast which shakes small using the elasticity of fishing rods, such as pitching and skipping, and flies lure on the nearby point is slow.

[0004] In performing the full cast, change a clutch device into a balking condition and a spool enables it to rotate freely, where a spool is pressed down to the middle with the thumb, a fishing rod is flung up back, and it shakes out a fishing rod for return and the arm of a wrist with all its strength ahead using a swing. Thereby, a fishing line lets out with sufficient vigor with the self-weight of lure. And a spool is pressed down with the thumb, the delivery rate of a fishing line is adjusted, just before lure lands on the water, rotation of a presser-foot spool is strongly suspended for a spool with the thumb, a handle is operated, a clutch is changed into an engagement condition and lure is operated.

[0005] In pitching, where it changed the clutch device into the balking condition similarly, it lowered the beam point of a fishing rod and a fishing line is stretched, it has lure in a hand, and flies lure with the elasticity of the fishing rod in the condition of having flung up the fishing rod upwards. The flown lure flies so that it may crawl near the water surface, and it lands at the point calmly.

#### [0006]

[Problem(s) to be Solved by the Invention] Generally, since inertia becomes large, when a spool of a major diameter carries out the full cast, a spool continues rotating with sufficient vigor and the flight distance of lure is extended. On the other hand, since a spool of a minor diameter is small, when inertia is small and the rotational resistance at the time of starting throws it lightly like the light cast, a fishing line lets out smoothly and flight distance is extended. Conversely, when a spool of a major diameter is thrown lightly, since the rotational resistance at the time of starting is large, it is [ that it is hard to let out a fishing line smoothly ] inelastic in flight distance. Moreover, since a spool of a minor diameter has small inertia, even if it carries out the full cast, it is inelastic in flight distance. That is, in the case of both the bearing reel, it is necessary to use a reel properly according to the casting approach, the reel which has a spool of a major diameter

does not turn to the light cast with slow initial velocity, and the reel which the reel of a minor diameter has does not turn to the full cast with quick initial velocity.

[0007] Then, it is possible to enable wearing of two or more spools with which paths differ to one reel. In this case, it is necessary to exchange spools according to the casting approach. When exchanging spools, it is difficult also to have to reset a fishing line and a mechanism, to take time in exchange, and to make it correspond to actual fishing. The technical problem of this invention is to enable it to correspond to two or more casting approaches that initial velocity differs, by one spool.

[0008]

[Means for Solving the Problem] A spool of both the bearing reel concerning invention 1 is a spool with which the body of a reel is equipped free [ rotation ], and is equipped with the body of a spool, and the inertia adjustment means. The body of a spool has the flange formed in both ends, and the bobbin drum section arranged between flanges. In order to adjust the inertia of a spool, the body of a spool is equipped with the inertia adjustment means.

[0009] By this spool, when initial velocity fishes with the late light cast, inertia of a spool is made small with an inertia adjustment means. Consequently, since the rotational resistance at the time of starting becomes small even if it throws lightly, a fishing line lets out smoothly from a spool. Moreover, in performing the full cast with quick initial velocity, it enlarges inertia of a spool. Consequently, surroundings flight distance is prolonged with vigor sufficient [ a spool ]. Here, it can respond to two or more casting approaches that initial velocity differs by adjusting inertia, by one spool.

[0010] In a spool of a publication, an inertia adjustment means is constituted for a spool of both the bearing reel concerning invention 2 from an another member by invention 1 with the body of a spool. In this case, since inertia adjustment means are a body of a spool, and another member, modification of inertia becomes easy by using the inertia adjustment means of different specific gravity from the body of a spool. In a spool invention 1 or given in 2, it is equipped with a spool of both the bearing reel concerning invention 3 by the inertia adjustment means free [ attachment and detachment on the body of a spool ]. In this case, an inertia adjustment means can be detached and attached or inertia can be easily changed by detaching and attaching the inertia adjustment means of different mass.

[0011] A spool of both the bearing reel concerning invention 4 consists of members which have different specific gravity from the body of a spool for an inertia adjustment means in a spool given in either of the invention 1-3. In this case, inertia can be changed with the inertia adjustment means of the same magnitude by the size of specific gravity. In the spool given in either of the invention 1-4, the periphery section of the flange of the body of a spool is equipped with the inertia adjustment means for the spool of both the bearing reel concerning invention 5. In this case, since the location most distant from the center of rotation which is easy to fluctuate inertia is equipped with an inertia adjustment means, the inertia adjustment means of small mass can adjust inertia greatly, and lightweight-ization of a spool can be attained.

[0012] In a spool given in either of the invention 1-5, after the inertia adjustment means has maintained dynamic balance, the body of a spool is equipped with a spool of both the bearing reel concerning invention 6. In this case, since an inertia adjustment means is in the condition which maintained dynamic balance, even if it rotates by a spool and one, the whole dynamic balance cannot collapse easily.

[0013]

[Embodiment of the Invention] Drawing 1 is the top view of the BEITO reel for lure fishing which adopted the spool by 1 operation gestalt of this invention. The BEITO reel shown in drawing is equipped with the body 1 of a reel, the handle 2 for spool rotation arranged in the side of the body 1 of a reel, and the star drag 3 for drag adjustment arranged at the body 1 side of a reel of a handle 2.

[0014] As drawing 2 shows, the body 1 of a reel has a frame 5, and the 1st covering 6 and the 2nd covering 7 with which the method of both sides of a frame 5 was equipped. The frame 5 has one pair of side plates 8 and 9 arranged so that predetermined spacing may be opened and it may counter mutually, and the pre-connection section 10 and the post-connection section 11

which connects these side plates 8 and 9. In one pair of frames 5, the sum rest 17 which serves as the level wind system 15 for winding yarn around homogeneity at spool 12 and spool 12 with the reliance of the thumb in the case of performing summing is arranged. Moreover, between a frame 5 and the 2nd covering 7, the gear device 18 for telling the turning effort from a handle 2 to spool 12 and a level wind system 15, the clutch engaging-and-releasing device 19 for performing engaging and releasing of a clutch, the engaging-and-releasing controlling mechanism 20 for controlling engaging and releasing of a clutch according to actuation of the sum rest 17, the drag device 21, and the casting control device 22 for adjusting the drag force at the time of rotation of spool 12 are arranged. Moreover, between a frame 5 and the 1st covering 6, the magnet-brake device 23 for suppressing the backlash at the time of casting is arranged.

[0015] The spool 12 is equipped with the body 13 of a spool of electric conduction metal of an aluminium alloy etc., and the inertia controller material 14 with which the body 13 of a spool was equipped free [ attachment and detachment ] as shown in drawing 3 and drawing 4 . The body 13 of a spool has flange 13a formed in both ends, and bobbin drum section 13b arranged between flange 13a. Flange 13a is really mostly formed in dished by the thickness of homogeneity from the both ends of bobbin drum section 13b, and as shown in drawing 5 , ring-like applied part 13c is formed in the periphery section. 13d of female screw sections for equipping with the inertia controller material 14 is formed in the inner circumference side of this applied part 13c. Bobbin drum section 13b is tubed part material, and as shown in drawing 4 , boss section 13e is formed in the inner circumference section of a shaft-orientations center section.

[0016] The inertia controller material 14 is a member for adjusting the inertia of spool 12, for example, is a zinc alloy with larger specific gravity than the aluminium alloy used for spool 12, a Magnesium alloy with small specific gravity, and a product made of synthetic resin. Applied part 13c formed in flange 13a of spool 12 both ends is equipped with the inertia controller material 14 free [ attachment and detachment ]. The inertia controller material 14 is a member of the shape of a ring which has dished disk section 14b stuck along with the lateral surface of cylinder part 14a to cylinder part 14a with which applied part 13c is equipped, and flange 13a. Male screw section 14c screwed in the peripheral face of this cylinder part 14a at 13d of female screw sections is formed. Moreover, 14d of heights which project in a way the outside for rotating the end face of cylinder part 14a with a finger separates spacing to a hoop direction, and they are formed in it. Here, in consideration of the direction at the time of a yarn delivery having rotation of spool 12 quicker than the time of yarn winding, when the delivery direction of spool 12 is the drawing 3 clockwise rotation, you may make it a reverse screw so that the screw of a near side is rotated in the delivery direction and it may be closed.

[0017] If this inertia controller material 14 equips or it removes, the inertia of spool 12 can be adjusted to two steps. Furthermore, the mass of the inertia controller material 14 changes by changing the specific gravity of the quality of the material of the inertia controller material 14, and inertia can be adjusted still more finely. Moreover, since the periphery section of flange 13a is equipped with the inertia controller material 14, big inertia can be acquired with the same mass. Moreover, since the inertia controller material 14 is the configuration where dynamic balance was maintained, even if it equips with the inertia controller material 14, dynamic balance of spool 12 cannot collapse easily. In addition, instead of changing mass with specific gravity, mass is changed with the configuration of the inertia controller material 14, and you may make it adjust inertia.

[0018] The spool 12 is being fixed to the spool shaft 16 which penetrates the core of boss section 13e. The spool shaft 16 is supported by the frame 5 free [ rotation ] by bearing, and the edge by the side of the 2nd covering 7 has extended so that 7 [ frame / 2nd ] may be penetrated and it may project in the side. The level wind system 15 has one pair of side plates 8, the guide cylinder 25 fixed among nine, the warm shaft 26 supported free [ rotation in the guide cylinder 25 ], and the Rhine guide 27. The gear 28 which constitutes the gear device 18 is being fixed to the edge of the warm shaft 26. Moreover, spiral slot 26a is formed in the warm shaft 26, and some Rhine guides 27 have got into gear to this spiral slot 26a. For this reason, the Rhine guide 28 reciprocates along with the guide cylinder 25 by rotating the warm shaft 26 through the gear device 18.

[0019] The gear device 18 has the master gear 31 fixed to the handle shaft 30, the pinion 32 which gears with master gear 31, and the gear 28 fixed to the worm shaft 26 above-mentioned edge. The pinion 32 has section 32b and narrow diameter portion 32c which geared with tooth part 32a and was formed between section 32b formed in tooth part 32a formed in the end side periphery section, and an other end side by gearing. Engagement heights 16a, engagement, or balking which the engagement slot is formed in the core of engagement section 32b, and was formed in the spool shaft 16 is possible. The clutch device is constituted by such configuration by engagement section 32b of a pinion 32, and engagement heights 16a of the spool shaft 16. Here, if a pinion 32 moves to the method of outside and the engagement slot of the engagement section 32b and engagement heights 16a of the spool shaft 16 break away, the turning effort from the handle shaft 30 will not be transmitted to the spool shaft 16.

[0020] The sum rest 17 is arranged in spool back by the posterior part between one pair of side plates 8, and 9 ( drawing 2 lower part). Moreover, the long hole (not shown) is formed in the vertical direction at the side plates 8 and 9 of a frame 5, and revolving-shaft 17a of the sum rest 17 is supported by this long hole free [ rotation ]. For this reason, the sum rest 17 can also be slid in the vertical direction along with a long hole. In addition, the last side face of the sum rest 17 is in contact with the post-connection section 11, and, for this reason, the pivotable include angle is regulated.

[0021] The clutch engaging-and-releasing device 19 has the clutch yoke 40. The clutch yoke 40 is arranged at the periphery side of the spool shaft 16, and is supported by the axis of the spool shaft 16, and parallel movable by two pins 41. In addition, relative rotation is possible for the spool shaft 16 to the clutch yoke 40. That is, even if the spool shaft 16 rotates, the clutch yoke 40 rotates. Moreover, the clutch yoke 40 has the engagement section which engages with the center section at narrow diameter portion 32c of a pinion 32. Moreover, on the periphery of each pin 41 which supports the clutch yoke 40, the spring 42 is arranged between the clutch yoke 40 and the 2nd covering 7, and the clutch yoke 40 is always energized with the spring 42 in the inner direction (frame 5 side).

[0022] With such a configuration, in the normal state, it is located in the clutch engagement location of the inner direction, the engagement section 32b and engagement heights 16a of the spool shaft 16 are engaged, and the pinion 32 is in the clutch engagement condition. On the other hand, when a pinion 32 moves to the method of outside with the clutch yoke 40, engagement to engagement section 32b and engagement heights 16a separates, and it will be in a clutch balking condition.

[0023] The engaging-and-releasing controlling mechanism 20 has the cam mechanism, and moves the clutch yoke 40 of the clutch engaging-and-releasing device 19 to spool shaft orientations by actuation of the sum rest 17. The drag device 21 has the friction plate 60 pressed by master gear 31 and the press plate 61 for pressing the friction plate 60 by the predetermined force to master gear 31 by rotation actuation of the star drag 3, as shown in drawing 2 . Moreover, the casting control device 22 has two or more plates 62 and 63 arranged so that the spool shaft 16 may be pinched, and the cap 64 for adjusting the pinching force of the spool shaft 16 by plates 62 and 63. The female screw is formed in the inner circumference section of cap 64, and it has geared with the male screw formed in the 2nd covering 7 side.

[0024] The magnet-brake device 23 has the brake case 65, the magnet electrode holder 66 prepared in the brake case 65, and the cap 68 for brake-force adjustment. It is fixed to one side plate 8, and the brake case 65 is \*\*\*\*\*. And the magnet electrode holder 66 is arranged in the brake case 65, and has two or more magnets 69 in flange 13a of spool 12, and the field which counters. Two pins 70 (only one is shown by a diagram) which project in a cap 68 side are being fixed to the tooth-back side (method side of outside) of the magnet electrode holder 66. On the other hand, the swash-plate-cam section is formed in the inner skin of cap 68, and the pin 70 is in contact with this swash-plate-cam section. It is possible by rotating cap 68 with such a configuration to adjust the gap between a magnet 69 and the spool 12 of electric conduction metal through a pin 70, and to adjust a brake force.

[0025] Next, actuation is explained. In the usual condition, the clutch yoke 40 is pushed on the inner direction with the spring 42, and, thereby, is moved to the engagement location by the

pinion 32. In this condition, engagement heights 16a of the spool shaft 16 gears with engagement section 32b of a pinion 32, it is in the clutch engagement condition, and the turning effort from a handle 2 is transmitted to the spool shaft 16 and spool 12 through the handle shaft 30, master gear 31, and a pinion 32. At this time, it is possible by adjusting the amount of bolting of the cap 64 of the casting control device 22 to adjust the drag force at the time of rotation of spool 12.

[0026] In casting, the sum rest 17 is pushed caudad and it changes a clutch device into a balking condition. If the sum rest 17 is pushed caudad, the sum rest 17 will move to a downward balking location along with the long hole of side plates 8 and 9. Thereby, the clutch yoke 40 is moved to the method of outside by operation of a cam mechanism. Since the clutch yoke 40 is engaging with narrow diameter portion 32c of a pinion 32, when the clutch yoke 40 moves to the method of outside, a pinion 32 is also moved in this direction. In this condition, engagement with engagement section 32b of a pinion 32 and engagement heights 16a of the spool shaft 16 separates, and it will be in a clutch balking condition. In this condition, the rotation from the handle shaft 30 is not transmitted to the spool shaft 16 and spool 12, but spool 12 will be in a free rotation condition. It casts carrying out summing in this condition.

[0027] Here, in carrying out the full cast, the body 13 of a spool is beforehand equipped with the inertia controller material 14 with larger specific gravity than the body 13 of a spool, and it enlarges inertia of spool 12. Thus, by enlarging inertia of spool 12, spool 12 continues rotating with sufficient vigor, and the flight distance of lure is extended. On the other hand, in carrying out the light cast, the inertia controller material 14 is removed, or it equips with the inertia controller material 14 with small mass beforehand, and makes inertia of spool 12 small. Thus, by making inertia of spool 12 small, the rotational resistance at the time of starting of spool 12 becomes small, and when a fishing line lets out smoothly and throws lightly, the flight distance of lure is extended.

[0028] Operation gestalt] besides [

(a) As shown in drawing 6 , 13f of male screw sections may be formed in the peripheral face of applied part 13c of the periphery section of flange 13a of the body 13 of a spool, and you may equip with the inertia controller material 14 of a major diameter there with a screw. In this case, the outer diameter of spool 12 is changeable in the condition of not equipping with the condition of having equipped with the inertia controller material 14. Moreover, when an outer diameter is changed, two steps of steps 9a and 65a for making the clearance between spools 12 small are formed in the side plate 9 and the brake case 65 so that a fishing line may not go into the interior.

[0029] (b) As shown in drawing 7 and drawing 8 , the ring-like slot 70 may be formed in both the lateral surface of flange 13a of the body 13 of a spool, and two or more inertia controller material 14 which consists of a circular magnet in the slot 70 may be arranged. In this slot 70, the circular crevice 71 for arranging a magnet separates spacing to a hoop direction, for example, it is formed at eight-place regular intervals. The holdfast 72 of the shape of an iron ring of magnetic metal is formed in the pars basilaris ossis occipitalis of a slot 70 by the proper formation approaches, such as plating. When the inertia controller material 14 is arranged to a crevice 71, the inertia controller material 14 is fixed to a holdfast 72 by magnetism. The inertia of spool 12 can be adjusted by adjusting the number of arrangement of this inertia controller material 14 (a maximum of eight pieces). In addition, when arranging the inertia controller material 14, if it arranges to the symmetry to a shaft center, dynamic balance cannot collapse easily. Moreover, since the inertia controller material 14 is arranged in a crevice 71, even if spool 12 rotates, the inertia controller material 14 does not shift according to a centrifugal force.

[0030] (c) As long as the wearing means of inertia controller material is a wearing means by which it is not limited to a screw and inertia can be changed, what kind of thing is sufficient as it.

(d) Inertia may be changed according to rotational speed. For example, inertia controller material is arranged free [ migration in the direction of a path of a spool ], it is energized to a core side by means of a spring etc., and you may make it move inertia controller material along the direction of a path according to a centrifugal force.

[0031]

[Effect of the Invention] If it makes inertia of a spool small with an inertia adjustment means in fishing with the light cast according to this invention, since the rotational resistance at the time of an orbit becomes small even if it throws lightly, a fishing line will let out smoothly from a spool. Moreover, if it enlarges inertia of a spool in performing the full cast, surroundings flight distance will be prolonged with vigor sufficient [ a spool ]. Here, it can respond to two or more casting approaches that initial velocity differs by adjusting inertia, by one spool.

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**DESCRIPTION OF DRAWINGS**

[Brief Description of the Drawings]

[Drawing 1] The top view of the BEITO reel (both bearing reel) by which 1 operation gestalt of this invention was adopted.

[Drawing 2] The cross-section top view.

[Drawing 3] The side elevation of a spool.

[Drawing 4] The IV-IV sectional view.

[Drawing 5] The cross-section enlarged drawing of the periphery section.

[Drawing 6] Drawing equivalent to drawing 4 of other operation gestalten.

[Drawing 7] Drawing equivalent to drawing 3 of other operation gestalten.

[Drawing 8] The cross-section partial diagrammatic view.

[Description of Notations]

12 Spool

13 Body of Spool

13a Flange

13b Bobbin drum section

14 Inertia Controller Material

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